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THE RUBBER RESEARCH INSTITUTE OF MALAYA

SMALLHOLDERS' ADVISORY SERVICE

ANNUAL REPORT 1951

L. R. DAVIDSON



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Administration and Organisation

SUPERVISION

The two senior officers, Mr. L. R. Davidson and Mr. J. M. F. Greenwood were on duty throughout the year. Satisfactory contact was maintained with Rubber Instructors in all districts and progress continued in the provision of aids to supplement the normal extension work of Rubber Instructors. It should be mentioned that incidence of leave throughout the service in 1952 and 1953 will restrict the amount of work which can be undertaken in all fields.

Visits by the two senior officers to inspect work on smallholdings in various districts are shown in the accompanying Table I.

At the request of the North Borneo Rubber Fund Board the senior Smallholders' Advisory Officer undertook a visit to smallholding areas in the Colony with the object of advising on the organisation of an advisory service for smallholders in the Colony. The tour involved absence from Kuala Lumpur from 10th February to 25th March; a report was written on return to headquarters and submitted to the Chairman of the North Borneo Rubber Fund Board.

Three Superintendent Rubber Instructors were on duty in their respective stations throughout 1951. In March 'Che Mohd. Aris bin Ahmad Fathil was nominated a smallholders' representative on the Rubber Producers' Council of Malaya. Subsequently, in October, 'Che Mohd. Aris was elected President of the Johore Smallholders' Association at the inaugural meeting of that body.

RUBBER INSTRUCTORS

Two new Rubber Instructors were appointed at the beginning of May; Mr. Aw Yong Kong Keong who had completed his training at the College of Agriculture, Serdang in April 1951, and Mr. Chong Min Fatt who left the College in the previous year. After training they were posted respectively to Bukit Mertajam and Kluang at the beginning of July. Mr. Chong Min Fatt was

TABLE I. *Visits by Senior Officers*

Month	Officer	State or Settlement	No. of Rubber Instructors	Days
January	Asst. S.H.A.O.	Selangor	2	2
"	"	Perak	5	3
"	"	Kedah	2	2
"	"	Province Wellesley	2	1
February	"	Selangor	-	1
March	"	Johore	4	2
"	"	Malacca	1	1
May	S.H.A.O.	Selangor	2	1
"	"	Perak	2	1
"	"	Malacca	2	5
"	"	Negri Sembilan & Malacca	2	2
June	Asst. S.H.A.O.	Pahang	1	1
"	"	Trengganu	2	7
"	"	Selangor	1	2
"	"	Kelantan	1	1
July	S.H.A.O.	Malacca	2	10
"	"	Negri Sembilan	2	1
"	Asst. S.H.A.O.	Perak	1	1
"	"	Kedah	1	3
"	"	Selangor	2	3
August	S.H.A.O.	Pahang	1	1
"	Asst. S.H.A.O.	Johore	5	3
"	"	Kedah & Province Wellesley	2	8
September	S.H.A.O.	Selangor & Trengganu	2	4
"	Asst. S.H.A.O.	Kelantan	3	2
"	"	Selangor	3	15
November	S.H.A.O. & Asst. S.H.A.O.	Perak	1	1
"	S.H.A.O.	Kedah & Province Wellesley	2	2
"	"	"	4	4

subsequently transferred to Batu Pahat because of the difficulty of obtaining satisfactory accommodation at Kluang.

Two Chinese Rubber Instructors resigned during the year. Mr. Tang Hon Loong former Rubber Instructor at Kluang obtained a managerial post in a group of rubber estates. Mr. Lee Yew Siong formerly Chinese Rubber Instructor at Seremban tendered his resignation while on specially accelerated leave on a British Council visitorship to England.

One of our Rubber Instructors, having undertaken voluntary part-time duty in the organisation of Kampong Guards in his district, was released for full time duty with the State War Executive Committee from 1st March to 31st July. The State War Executive Committee were particularly appreciative of the assistance rendered.

Transfers made during the year, with the date on which the Rubber Instructor reported to the new station, are recorded below:—

Syed Mamdooh Wafa bin Syed Hashim	-	Ipoh to Pontian	-	5th March
Abdul Aziz bin Pagon	-	Pontian to Temerloh	-	5th April
Chan Seng Kiat	-	Nibong Tebal to Kuantan	-	6th June
Mohd. Razalli bin Uda Yahya	-	Pekan to Kajang	-	22nd June

'Che Zainal Abidin bin Baharuddin, Rubber Instructor Jitra, was temporarily transferred to Kelantan for a period of five months May to September 1951. He was stationed at Pasir Mas while in Kelantan.

Mr. Chong Min Fatt suffered serious injury in a motor cycle accident in September and was unable to resume duty during the remainder of the year.

Towards the end of the year information was received that Mr. Aw Yong Kong Keong had been awarded a Colonial Development and Welfare Scholarship commencing in 1952. The scholarship will be tenable for 4 years and will enable Mr. Aw Yong Kong Keong to study Botany for a B.Sc. degree at a University in Australia, New Zealand or the United Kingdom.

At the end of the year there were 37 Rubber Instructors. The distribution of field staff is shown in Table II.

TABLE II. *Distribution of Field Staff as at 31st December 1951*

State or Territory	Area of Rubber* Smallholdings	Superintendent Rubber Instructors	Rubber Instructors			Rubber Demonstrators	Average acreage per Rubber Instructor
			Malay	Chinese	Indian	Total	
Perak	260,234	1	4	2	1	7	37,176
Selangor	157,825		3	-	1	4	39,456
Negri Sembilan	108,250	1	2	-	1	3	36,083
Malacca	88,155		1	1†	-	2	44,077
Johore	411,145	1	3	4	1	8	45,683
Pahang	89,522	-	1	1	-	2	44,761
Kedah/Perlis	144,571	-	4	-	-	4	36,143
Kelantan	78,359	-	1	-	-	1	78,359
Trengganu	25,945	-	1	-	-	1	25,945
Penang & P. Wellesley	29,875	-	-	1	-	1	29,875
Singapore	8,285	-	-	-	-	-	
Leave		3	20	9	4	33	
Experiment Station		-	-	3	-	-	
		-	1	-	-	-	
Totals	1,402,166	3	21	12	4	37	

* *Figures taken from the Rubber Statistics Handbook 1950.*† *The Chinese R.I. in Malacca worked also in Negri Sembilan.*

RUBBER DEMONSTRATORS

The Rubber Demonstrator, Kinta, Ahmad Daniel bin Mohd. Rashid died in October. Three Rubber Demonstrators resigned during the year and 'Che Alias bin Jamik of Ulu Langat ceased to be a Demonstrator on appointment to assist in the supervision of trainees on the smallholders nurseries developed under the C.D.W. Scheme at the R.R.I. Experiment Station. Three Demonstrators were not re-engaged on completion of their periods of service and one who was on probation at the beginning of the year was not retained. One Rubber Demonstrator was dismissed. Seven new Rubber Demonstrators were engaged during the year and there were therefore 43 Demonstrators in the service at the end of the year.

There has been delay in filling vacancies in the Rubber Demonstrators cadre because we have considered it desirable generally to adhere to the policy of appointing as Demonstrators only young men who have satisfactorily undergone a course of training at Sungei Buloh and who are residents of the districts in which they will have to work. It is expected that in 1952 and subsequent years it will be easier to get the men we require in the districts where they are wanted.

RUBBER INSTRUCTORS AT R.R.I. EXPERIMENT STATION

From April onwards, with the exception of the month of Ramadhan, Rubber Instructors were stationed in sequence at the R.R.I. Experiment Station.

It is necessary for a Rubber Instructor to be available to undertake overall supervision of the courses for training of kampong youths and to give lectures and instruction in Malay. At the same time Rubber Instructors benefit from direct experience of new developments at the Experiment Station. It is desirable that the Rubber Instructors should not be away from their own stations in excess of one month but, in exceptional circumstances, we were able to station 'Che Mohd. Noordin bin Ahmad at Sungei Buloh from September until the end of the year.

RUBBER INSTRUCTORS' CONFERENCE

The second post-war conference of Rubber Instructors took place at the Rubber Research Institute from August 20th to 22nd. All Rubber Instructors attended and we

had the benefit of the attendance of visitors from collaborating organisations at appropriate sessions of the meeting. The principal subjects of discussion were,

- (1) Extension Aids for Rubber Instructors
- (2) Planting and Planting Material
- (3) Centralised Processing of Smallholders' Latex

Under the first heading discussion covered the parts to be played in extension work by films, leaflets and broadcasting. The recently completed R.R.I. instructional films were viewed by Rubber Instructors at a first screening and members of the staff of the Malayan Film Unit assisted by answering questions and replying to criticisms. We were fortunate in the attendance of Mr. J. N. McHugh, the Director of Information Services, and Mr. D. J. Lyttle of the Department of Broadcasting to provide information on the use of printed matter and broadcasting respectively.

Planting and processing of rubber provided fields for Rubber Instructors to inform their colleagues of interesting developments and projects on which they had first hand information.

RUBBER COURSE AT THE COLLEGE OF AGRICULTURE

Three Rubber Instructors were again available to assist with the annual course on rubber at the College of Agriculture. This occupied ten days in November and the Rubber Instructors who attended were 'Che Shamsudin bin Mohd. Arabee, 'Che Yahya bin Ma'amor and Mr. Anthony G. Mak. At the conclusion of the course all students visited the R.R.I. Experiment Station, at Sungei Buloh, the Rubber Research Institute laboratories and the R.R.I. smallholding.

SMALLHOLDERS' RUBBER ADVISORY COMMITTEE

The tenth meeting of this Committee was held at the Rubber Research Institute on 17th October when the estimates of expenditure for the Smallholders' Advisory Service in 1952 were considered. Various aspects of extension work and assistance required by smallholders, particularly in relation to requirements for planting material, were discussed. While it was considered that the efforts of the Department of Agriculture and the Rubber Research Institute were rightly being concentrated

on assistance to the owners of the smallest category of holding it was agreed that supplies of budwood in official nurseries surplus to the needs of smallholders should, wherever possible, be made available to owners of 25 to 100 acres of rubber land.

The Committee considered the difficulties arising to the service from shortages of housing in many districts. It was agreed to be desirable that the Rubber Research Institute should undertake building where this appeared to be essential to secure continuity of accommodation in areas where Rubber Instructors are likely to be permanently stationed.

SAMPLE SURVEY OF YIELDS ON SMALLHOLDINGS IN JOHORE

Rubber Instructors in Johore have continued to obtain records from the selected sample of smallholdings established in 1950. These have been forwarded to the Economics Department of the University of Malaya.

RURAL AND INDUSTRIAL DEVELOPMENT AUTHORITY

Collaboration with the Rural and Industrial Development Authority, which was set up towards the end of 1950, increased during the year. The Rubber Research Institute has been represented on the Rubber Committee and Rubber Working Party of the Authority and a large part of the preliminary planning and provision of technical data for schemes connected with the manufacture of smallholders' rubber has been undertaken by officers of the Rubber Research Institute. Staff of the Chemical Division, particularly the Chemical Engineers, have been called upon for assistance on several occasions, while the Smallholders' Advisory Service has undertaken the general correlation of technical information relating to the several schemes under consideration.

SMALLHOLDERS' ASSOCIATIONS

The movement amongst smallholders to form their own associations is one which must be of considerable interest to an extension service such as ours. The economy in time in the provision of instruction is considerable where the people have the habit of meeting together to discuss their problems. There are obvious economic advantages to be obtained from organised action which should assist the developments necessary for the progress of the rubber smallholders on sound technical lines.

In 1949 a Smallholders' Association was formed in Ulu Langat and another had been formed at Kuala Brang early in 1951. These associations were on a district basis but such organisations may provide the initial steps of a large movement. Rubber Instructors have kept in close touch with such developments in their respective districts.

The Johore Smallholders' Association was inaugurated in October and provided simultaneously a strong State central organisation with numerous active district branches. This has given a strong impetus to the movement in other parts of the country. A district association was later formed at Bukit Gantang in Perak, while in Perak also there has been a movement, emanating from the Parit district, to form a central organisation.

Two members of the staff of the Smallholders' Advisory Service have played important parts in the inauguration of the Johore Smallholders' Association and have felt obliged to accept executive positions in the organisation in order to assist in orderly and efficient development. 'Che Mohd. Aris bin Ahmad Fathil, Superintendent Rubber Instructor, Johore, has been elected President of the Association and 'Che Mohd. Jamli bin Hj. Mohd. A. Wasi, Rubber Instructor, Batu Pahat has become General Secretary. The Board of the Rubber Research Institute has agreed to these officers continuing to undertake the respective duties imposed upon them by their offices in the association for a trial period but it is considered that staff of the Rubber Research Institute should confine their assistance to such associations to the technical fields in which they are competent and in which their assistance is greatly needed. Further acceptance by Rubber Instructors of executive positions in smallholders' associations will not be permitted but technical advisers on matters related to their regular duties.

VERNACULAR PUBLICATIONS

The series of leaflets planned in collaboration with the Department of Information (former Public Relations Department) in 1950 was completed with the publication during the first half of the year of the last two leaflets.

Leaflet No. 4. Budgrafting

„ No. 5. Centralised Manufacture

These leaflets were published in Malay (Jawi script), and Chinese, and a limited number of copies of the English text of the fifth leaflet were printed for supply to officers of the Rural and Industrial Development Authority.

Further publications undertaken during the year were produced entirely by Rubber Research Institute staff.

A Manual on "Control of Root Disease in Young Rubber" was published as *Smallholders' Advisory Service Publication No. 3* as a continuation of the series which commenced before the war with the publication of vernacular editions of Planting Manuals No. 7 and 8.

Mr. Greenwood in consultation with the Pathological Division compiled this booklet in which the text was kept to a minimum and full use made of photographs for illustrations. These were specially taken for the publication by Mr. Hoh Choo Chuan. Translations were prepared by the officers listed below;

Malay - Tuan Syed Mamdooh Wafa

Chinese - Mr. Low Kai Choy

Tamil - Mr. S. Karalasingam (Botanical Division).

As No. 4 in this series, the publication of a Malay edition of J.R.R.I.M. Comm. 268 was completed. The Malay text was prepared by 'Che Mohd. Rouse bin Haji Mohd. Amin.

At the Rubber Instructors' Conference in August general approval was expressed for the style of S.H.A.S. Publication No. 3 which was considered the most easily intelligible to the smallholder. The poster on budgrafting prepared in 1950 was also considered particularly suitable because of the detailed illustration of every stage by drawings. Rubber Instructors were generally of the opinion that coloured illustrations would be especially valuable in stimulating smallholders' interest in the subject matter.

For these reasons it was decided to prepare a manual on budgrafting based on a coloured edition of the line drawings used in the poster. Translation of the limited text was undertaken by the same persons as for S.H.A.S. Publication No. 3 and the material for the manual "Budgrafting", S.H.A.S. Publication No. 5 was passed to the printer in December. It will be published in two editions, one containing text in Malay and Chinese and the other in Tamil and English.

INSTRUCTIONAL FILMS

Commentaries for the last four films were completed in the first quarter of the year but final editing of the films was delayed by the large volume of emergency work which had to be undertaken by the Malayan Film Unit.

The first show copies of the six films were completed for a first screening at the Odeon Cinema on the 20th August. All Rubber Instructors attended this screening as well as students from the College of Agriculture and trainees in residence at Sungei Buloh at the time. Guests were invited from Departments and organisations whose work is closely allied to our own. These included the Departments of Agriculture, Co-operative Development, Information and Broadcasting and the Rural and Industrial Development Authority.

Minor changes were required in some of the films and when these had been completed the negatives were sent to Australia for reduction printing. 16 m.m. copies should be available for screening by the mobile units of the Department of Information early in 1952.

BROADCASTS

The initiation of special programmes for rural audiences, designed particularly for the community listening service, provided the opportunity for renewed collaboration with the Department of Broadcasting in the provision of material of special interest to rubber smallholders. Members of the staff of the Malay and Chinese rooms at Radio Malaya were taken on visits to the R.R.I. Experiment Station and to projects in various parts of the country likely to be of special interest to rubber smallholders.

Four talks were recorded in August and September:

- | | | |
|---|---|---|
| 1. Budgrafted Rubber | - | Inche Mohd. Salleh (of Radio Malaya). |
| 2. Clonal Seedlings | - | Inche Mohd. Salleh (of Radio Malaya). |
| 3. Organisation of Latex Collection from Smallholders | | Inche Abdul Rahman bin Hj. Daud, (Rubber Instructor, Taiping). |
| 4. Centralised Manufacture of Sheet Rubber | - | Inche Hussein b. Hj. A. Samsuddin, (Superintendent Rubber Instructor, Perak). |

Plans have been made for a fourth series of broadcasts to be prepared by Rubber Instructors and it is proposed to make considerable use of dialogues and short plays to maintain interest. At the end of the year four scripts had been submitted by Tuan Syed Mamdooh Wafa.

Field Work and Advisory Policy

PRODUCTION

The emergency has had a considerable effect in some areas where large areas of rubber have been closed for production by total curfew. The total of these areas however has been a small proportion of the smallholders rubber land and hardly sufficient to explain a marked fall in the years production of rubber by Malayan smallholders.

The effect of the emergency on rubber production may be more readily explained by disorganisation of established routine in many different directions over a large proportion of the country's rubber. Resettlement of country dwellers removes smallholders and their tappers to some distance from their tasks; partial curfews prevent the early morning starts which were a feature of share tappers' methods; at the same time prohibition on carrying food to work in many districts reduces the working hours for tappers. These interferences with established practice on smallholdings result in lower output per man and per unit area and a noticeable effect on the production of the country might therefore be expected.

In those areas which are most accessible for tapping the price of rubber has been such as to induce a very high intensity of tapping. There is no doubt that as a result of this the productive capacity of the oldest smallholding rubber has declined. Possibly the capacity to produce rubber would be restored by a long rest, such as occurred in the period of the Japanese occupation, and might again result from a long period of low prices. There can be no doubt however, that the non-productive period would be better faced with replanted rubber with which other economic crops might be cultivated to produce some immediate return from the land.

It is unfortunate for the country and the individual smallholder that replanting of smallholdings will have to be undertaken intensively over a short period of years when the smallholders' production will be low. Hurried work, with skill and technical assistance inadequate for the work involved, will result in failure to obtain the maximum benefits from replanting.

MANUFACTURE

Many projects developed during the year which involved the collection of latex from smallholders for central processing. The greatest proportion of the latex involved in such schemes was collected by organisations interested in the production of latex concentrate. In Kedah, where the central collecting-cum-processing station had been first developed and most widely adopted, these stations turned over to the sale of latex wherever a market offered. In other States, notably Selangor, Negri Sembilan and Johore, the first development was of stations initiated purely for the collection of liquid latex for concentration. The disadvantages of sole dependence on the liquid latex market became evident towards the middle of the year when the market for concentrate was considerably reduced. In one area in Selangor collections had to be reduced by half at short notice and equipment was not available for the immediate substitution of factory manufacture of smoked sheet. The earliest plan to initiate a R.I.D.A. scheme for centralised manufacture of smallholders' rubber at Grissek in Johore was based on the sale of latex to commercial organisations in the initial stages. This had to be abandoned while plans were worked out for the manufacture of smoked sheet in one large factory in the mukim.

After the middle of the year developments for the centralised processing of smallholders' latex took the form of establishment of factory organisations for the manufacture of smoked sheet. The amount of rubber collected from smallholders as latex, however, steadily declined until December when some improvement resulted from renewed demand for latex concentrates. An indication of the scale of rubber latex collections from smallholders, is provided in Table III, which has been compiled from records made by Rubber Instructors.

The small co-operative factory at Kampong Tallang unfortunately ceased to operate owing to disagreement amongst the members but other small organisations developed in Perak at Dendang, Bendang Siam, Kampong Menora, Kampong Batu Hampar and Kampong Gajah; in Malacca at Sungei Buloh and in Johore at Pinang Seribu and Serom. One or two of these projects were assisted with equipment lent by the Rubber Research Institute where this could conveniently be arranged.

Larger factories were established by enterprising individuals at Pandan and Segamat in Johore and at Ulu Langat in Selangor.

TABLE III. *Rubber (in tons) Collected from Smallholders in the form of Latex as recorded by Rubber instructors*

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Kedah ..	365	348	231	209	1,153
Selangor ..	424	226	162	105	917
N. Sembilan ..	235	288	168	39	730
Johore ..	344	433	464	386	1,627
Perak ..	34	36	49	32	151
	1,402	1,331	1,074	771	4,578

Special assistance has been given to R.I.D.A. when required in the investigation of the possibilities of central manufacture of smallholders' latex at Grissek in Johore, Ulu Langat in Selangor and Temerloh in Pahang.

PLANTING OF RUBBER

Figures in Table IV show that there has been little change in the scale of replanting since 1950 and that the small increase results from replanting on the largest size of smallholding.

The addition to the replanting of areas felled during the Japanese occupation has been surprisingly maintained at the level of the past two years and the high price of rubber has evidently overcome earlier apathy and induced the replanting of some more of the derelict land. Since it may be difficult, after the elapse of more than six years, to determine whether replanting falls within the category of areas felled during the occupation, we do not propose to attempt to collect further separate data for these areas. Totals of areas felled between 1942 and 1945 and recorded as replanted by Rubber Instructors up to the end of 1951 are given in Appendix "D".

New planting has continued at an increased rate and is being undertaken almost exclusively in the smallest category of holding. The policy (and activity) of Land Offices are however reflected in the figures and it is difficult to assess what is the strength of the popular demand. Up-to-date the rate at which Land Offices have considered applications for land has limited the amount of legitimate rubber planting and the customary alienation of land in lots of 3 to 5 acres has continued. It is unfortunately impracticable for us to collect statistics of new planting on a basis of total rubber land in the ownership of the planter rather than on the individual alienations.

Approximately 60 per cent of all planting was carried out during the last three months of the year. Planting during the principal and most reliable rainy season is desirable and considerable improvement in practice has been noted in the past two years. It is probable that the most important contributory factor to this change has been the control of supplies and distribution of clonal seedlings by the Department of Agriculture and the Rubber Research Institute.

PLANTING MATERIAL

Our activities under this head have centred on assistance in the operation of the "C.D. & W. Scheme D.1176" and these are recorded in an appendix to this report (Appendix "A"). There are however certain aspects of general problems related to planting materials for smallholders which call for special comment.

Figures of total planting and the acreage planted with clonal seedlings (Table V) indicate the continued popularity of this type of material and further evidence of the relatively strong demand for clonal seedling stumps is obtained on almost all direct contacts with smallholder rubber growers. On the other hand, our very considerable efforts to encourage budgrafting, although coupled with plentiful supplies of cheap budwood, have resulted in much smaller acreages of budgrafted rubber trees.

TABLE IV. *Summary of Replanting and New Planting on Smallholdings 1951*

STATES	REPLANTING			NEW PLANTING		
	TOTAL	By Category of Holding			TOTAL	By Category of Holding
		< 10 ac	10—25	25—100		< 10 ac 10—25 25—100
Selangor	402	277	43	82	246	246
Negri Sembilan	327	203	50	74	892	812 20 60
Malacca	663	262	236	165	110	94 16 —
Perak	888	650	103	135	134	134 — —
Johore	578	313	90	175	1,189	1,168 21 —
Pahang	108	94	14	—	1,370	1,370 — 42
Kedah & Perlis	364	293	8	63	1,190	1,140 8 —
Penang & P. Wellesley	448	29	292	127	—	— — —
Kelantan	—	—	—	—	220	220 — —
Trengganu	—	—	—	—	237	181 24 32
TOTAL	3,778	2,121	836	821	5,588	5,365 89 134
Percentage for category of holding	—	56%	22%	22%	—	96% 1.5% 2.5%

TABLE V. *Planting of Rubber and Establishment of High-Yielding Areas in 1951*

State/Settlement	Total Planting acres	Area Planted with Clonal Seedlings acres	Total area Budgrafted acres
Selangor -	648	611	68
Negri Sembilan -	1,219	682	185
Malacca -	773	426	202
Perak -	1,022	836	130
Johore -	1,767	1,004	324
Pahang -	1,478	1,279	12
Kedah/Perlis -	1,554	686	894
Penang & P.Wellesley	448	180	49
Kelantan -	220	188	298
Trengganu -	237	237	6
	9,366	6,129	2,168

Table VI represents an attempt to assess the degree of success in securing the budgrafting of areas not planted with clonal seedlings. The 1950 acreages of total planting and clonal seedling planting, the difference between these figures, and the total acreage budgrafted in 1951 are given. The last two columns from a similar table given in the 1950 report are repeated in view of the fact that budgrafting may reasonably be carried out up to 2½ years after planting.

The figures give a superficial appearance of improvement in the proportion of unselected seedlings which have been budded but it is important to note that the area budgrafted in Kedah includes 650 acres of land which had been illegally planted prior to alienation and that such land has not been recorded in the planting figures for previous years. There may be other inclusions of a similar nature though they are not expected to be large and there is a possibility that some budgrafting has been done in areas which were planted with clonal seedlings. It is however possible that the acreage planted with clonal seedlings has been understated from lack of knowledge of the source of supply of seed which a small-holder may obtain privately from an estate.

A cautious conclusion from the figures is that about one-third of the area which should be budgrafted remains as unselected seedling rubber. This shows some improvement on earlier practice as will be seen from a study of figures in Appendices "B," "C" and "E."

TABLE VI. *Comparison of Field Budding against nominal theoretical requirements*

State/Settlement	Total Planting 1950	Clonal Seedling Planting 1950	Difference 1950	Budgrafting 1951	Difference 1949	Budgrafting 1950
Selangor	849	667	182	68	382	176
Negri Sembilan	654	305	349	185	107	200
Malacca	563	282	281	202	444	370
Perak	1,004	865	139	130	439	55
Johore	1,102	524	578	324	840	802
Pahang	1,497	1,315	182	12	78	15
Kedah & Perlis	658	461	197	894	271	101
Penang & P. Wellesley	460	288	172	49	290	237
Kelantan	149	20	129	298	407	340
Trengganu	144	137	7	6	2	18
TOTAL	7,080	4,864	2,216	2,168	3,260	2,314

There can be no doubt that the availability of supplies of good, well-grown clonal seedlings has done much to stimulate, amongst smallholders, an interest in rubber planting at a time when the price of rubber is a serious deterrent to replanting. The demand for clonal seedlings tends to have been accepted as an indication of the smallholders' preference in planting material and there is a danger that it will be held to justify disproportionate attention to the provision of clonal seed for smallholders. The nature of the smallholders "preference" requires careful examination.

The arguments put forward against budgrafts on smallholdings are mainly those which were advanced by practical planters 20 to 30 years ago when budgrafting of rubber trees as a plantation practice was in its infancy. They are that the budgraft is an "unnatural" tree, a branch, with the bark of a branch and therefore not likely to stand up to tapping for the same number of years as a seedling tree. Budgrafts are now accepted by large estates and provide the trees for the greatest acreages of current replanting. If the life of a budgraft under continuous tapping is not as great as for a seedling tree (and of this we are not yet sure) it is considered adequate to take the maximum commercial advantage from the continued development of new planting material.

The smallholder in general does not like the additional work involved in budgrafting and the maintenance of the young budgrafted trees. Particularly he dislikes the cutting back of a vigorous young plant to nearly ground level and the presumed sacrifice of a year's growth. It is held by many that young budgrafts will not stand the smallholders "methods" of tapping while it appears to be assumed that the clonal seedling will do so. There is quite insufficient evidence from mature areas of either type of material in smallholders' hands or in other hands for that matter, on which conclusions of this kind can be justified and future action must be guided to a certain extent by such information as is available from large estates. This suggests that both budgrafts and clonal seedlings are subject to physiological unbalance more readily than the average of unselected seedling trees, and in general the incidence of brown bast is higher amongst both clonal seedlings and budgrafts than in unselected seedling areas. This is considered to be a direct consequence of their higher yielding properties: brown bast

incidence also increases, in all trees, with increase in tapping intensity.

The smallholder generally taps a cut of less than half circumference daily for lengthy periods and he *may* tap his trees from 250 to over 300 times per annum. This contrasts with the half-spiral alternate-daily system usual on estates and under which trees are tapped about 160 times per year. If brown bast is high with budgrafts and clonal seedlings on the latter system it is likely to be more serious under smallholders' methods and the good clonal seedlings are known to be more susceptible to brown bast than any of the clones recommended for budgrafting on smallholdings.

A further comparison between clonal seedlings and budgrafted trees requires consideration. It is frequently urged that the corky seedling bark of the former is more suitable for the smallholder, the assumption being that the smallholder tapper is less skilled than the estate labourer. This ignores the fact that the thinner bark of budgrafts is uniform in thickness and texture for all trees of one clone under comparable conditions. Smallholders have shown surprising ability to tap very thin bark on their own holdings and in many districts they tap budded estate rubber hardly less skilfully than resident labourers.

The foregoing considerations suggest that for the often-heard comment that clonal seedlings are the best material for smallholders there may be no foundation; if smallholders are going to establish high-yielding trees of any description they should, and undoubtedly will, alter their methods of tapping to the systems which have proved satisfactory for their material. Any failure to do this may have a more damaging effect on clonal seedlings than on budgrafts. In the meantime it seems to be necessary to take steps to enable the smallholder to form a really well founded preference, based on actual experience of the two types of planting material, by continuing to make both types available and to use all possible means to secure the establishment on smallholdings of at least equal areas of budgrafts and clonal seedlings. Such a policy would be in keeping with the supplies of planting material available and the possibilities for extension of supplies of budwood and clonal seeds.

In Appendix "A" the relative scarcity of supplies of suitable clonal seed for smallholders is noted. The general method of supplying clonal seedling material as clonal seedling stumps, and the trials in which clonal seed has

been supplied direct to smallholders, are described. The supply of clonal seed—germinated or ungerminated—direct to smallholders would be the most satisfactory and economical method of satisfying their needs. But reliable material is scarce and distribution of seeds may be so wasteful as to be justifiable only when plentiful supplies of good clonal seeds are available at economic prices. So long as supplies are limited, direct supply of seeds should be adopted with caution and only when the industry and conscientiousness of the recipients ensures that the material will be satisfactorily used. There are however certain areas to which the transport of clonal seedling stumps is so expensive as to be impracticable, and supply of seed to smallholders in such cases is the only satisfactory method of meeting the demand for seedlings.

The best guarantee of satisfactory use of seed by smallholders should be obtained when the nursery requirements for a district, mukim or kampong can be provided by the smallholders acting together. Smallholders' Associations and co-operative enterprises may have an important part to play in this respect and the penggawas and penghulus in Kelantan and the Smallholders' Associations in Johore and Trengganu are showing what can be done by good leadership.

RUBBER GROWING AND SIZE OF HOLDING

Such information on size of holding as can be found from official statistics indicates that there are nearly one million acres of rubber land divided into holdings of 25 acres or less. Since it is estimated that there are about 350,000 holdings, the average size of holding must be less than 3 acres. This reckoning, however, takes no account of single ownership of several holdings or lots of land which are registered separately and on this aspect the available statistics provide no information. The experience of field workers is that such composite holdings are not unusual and the amount contributed to the total acreage of the country may be substantial.

The common practice of land alienation, which has presumably been followed since before rubber trees were grown in Malaya, is to divide land into 3 or 5 acre lots or, in Kedah, Kelantan and Trengganu in lots of 3 or 5 *relongs**. Since no man is likely to get more than one lot in any

* 1 *relong* = .71 acre

land alienation scheme and the common inheritance procedure may lead to division of land, the occurrence of holdings of less than 5 acres is understandable.

It seems reasonable to visualise the great majority of smallholders as residing on holdings of about 3 acres, and therefore *the greater part of the livelihood of such families must obviously come from other sources.* In the more rural districts some individuals may have acquired additional land in one or more lots as the jungle has been pushed back and the land alienated in a gradually increasing arc from the original kampong. Other land in single ownership is acquired by purchase by the more well-to-do who may obtain land in several mukims or even in different districts, and by inheritance.

The small size of holding has had a considerable influence on the system of harvesting rubber and appears to be a principal reason for the system of share tapping in which owner and tapper agree to divide the crop equally or in proportions which are less favourable to the owner.

Three acres of old seedling rubber hardly provide a tapping task for an adult worker particularly when it is tapped on the short single cut, intensive system of the smallholder which results in a high proportion of trees out of tapping at any one time. A smallholder may therefore see good reason to have his tapping done by a professional tapper who can usually fill up his requirements for full employment by a similar agreement with a neighbouring smallholder.

Share tapping is generally destructive to the trees because of the principal interest to the tapper of immediate yield. It accounts for the poor state of trees on very many smallholdings. It provides, furthermore, a relatively poor return to the proprietor and results in inflation of production costs for all sections of the industry. The conclusion appears justifiable that an increase in size of holdings, were this possible, would result in improved methods of smallholders' production of rubber.

In another context (under Planting Material) reference is made to the changes which are required in smallholders' methods of production if the advantages of modern high yielding rubber trees are not to be lost to the smallholder. The need for tapping such rubber at an intensity not greater than the half-circumference alternate-daily system and acceptance of the fact that replanting is a recurrent

necessity in rubber production give some indication of the minimum unit for rubber production.

A holding should provide two tapping tasks so that continuous work is available for at least one of the principal breadwinners of the family. Three acres of well planted rubber is the minimum to provide a single full tapping task and a holding should therefore have at least six acres of productive rubber. As a reasonable provision for replanting, allowance should be made for one quarter of the rubber being continuously out of production. Eight acres of rubber land would therefore provide a reasonable holding for a small family but if diversification of agriculture proves feasible in this country alienation of land in lots of 10—15 acres would appear to be well justified.

It is appreciated that no revolutionary change in the size of unit for the rubber-growing smallholder can be quickly achieved for the whole country. It might however be reasonable if future land alienations could be made on a basis which offered the participants the best chance of success as rubber growers along with means to grow other crops, and in these larger alienations it would have to be accepted that rapid establishment of rubber throughout a new holding is neither necessary nor desirable. Careful selection of applicants for land on evidence of energy and farming ability is desirable and if this were practised in new land alienations examples could be created which might in the future result in suitable amalgamation of old holdings by purchase or by other means, and lead to a gradual increase in efficiency of production.

REPLANTING DEMONSTRATIONS ON SMALLHOLDINGS

There has been a net loss of two demonstrations during the year. In one case the plot fell within a resettlement scheme and the other had to be abandoned because satisfactory collaboration could not be obtained from the owner and routine maintenance was inadequate. There has been no extension of the number of demonstration plots because in nearly all districts where replanting is of immediate importance sufficient work is being done by smallholders to keep Rubber Instructors fully occupied and to provide locations for demonstrations of approved practices.

Of the 17 demonstrations established mainly in 1949 or earlier, ten were provided with fertilizers, two were

budgrafted and three were provided with seed of creeping leguminous covers for establishment on the conclusion of inter-row cultivation of vegetables.

THE R.R.I. SMALLHOLDING, AMPANG

Areas replanted before the war with budgrafts of Tj.1 and Pil.B.84 have continued to be tapped according to the requirements of the Botanical Division's experiment in which S/2, D/2 100% is being compared with S/3, 25D/30, 111%.

A small plot of Tj.1 is still untapped although 11 years old. The 70 odd trees are being maintained against possible requirements of the Chemical Division for latex from virgin trees.

Only three acres of the holding now remain in which no replanting has been undertaken. This area will be kept in tapping as long as possible to supply fresh seedling latex for the Chemical Division. It is, however, doubtful if bark reserves are sufficient for tapping beyond the end of 1952.

The 1948, 1949 and 1950 hedge-plantings have shown that the system permits crop to be obtained from at least a proportion of the old trees during a part of the period of immaturity. Girth measurements in the 1948 and 1949 "hedges" will be taken at six-monthly intervals to determine when further destruction of the old trees remaining between hedges is necessary to permit satisfactory development of the young trees.

Periodic recording of the yield of the pollarded old trees in the 1950 hedge-planted area has shown that yield averaged about 40% of the yield of the area before replanting was initiated in 1949. A decline to 31% was however recorded in the last two months of the year.

The half-acre nursery area at Ampang Road has been intensively managed and has provided 14,500 clonal seedling stumps for distribution. An area of the clonal seedling section had been ear-marked for a budwood multiplication nursery and about 1,500 plants were left in this area to provide stocks for budding. In addition seedlings of special interest to the Botanical Division have been maintained in the area, and an area has been planted with young seedlings to provide a special budwood nursery for the Division.

The cover crop "museum" has been extended during the year and now contains a fairly representative

collection of the leguminous covers available in this country.

ACKNOWLEDGEMENTS

We have to acknowledge the assistance received from Agricultural Officers in all States and Settlements through their continued interest in our work. At headquarters we have appreciated the attention which the Director of Agriculture and the Chief Field Officer have always been willing to give to our problems.

Data recorded in these reports have been obtained from monthly statements of Rubber Instructors who maintain careful records of the developments with which they are in personal contact. It can be accepted as accurate so far as it goes with the important qualification that our field staff is not yet able to cover adequately all areas of the country where smallholders' rubber is grown.

L. R. DAVIDSON

Smallholders' Advisory Officer.

Smallholders' Advisory Service,

20th February, 1952.

COLONIAL DEVELOPMENT AND WELFARE SCHEME D.1176

**Supply of Planting Material and
Provision of Technical Assistance**

R.R.I. co-operation with the Department of Agriculture in carrying out the requirements of the scheme has been continued during 1951. The main part of the Rubber Research Institute share in this project is carried out by staff of the Smallholders' Advisory Service and the R.R.I. Experiment Station with the advice and assistance of the Botanical Division.

1951 is the second complete year since the scheme received approval and the first therefore in which the full benefits of the undertaking might be expected to be available to smallholders. Within the limits set by the approved plans the results may be considered relatively satisfactory.

The plans relating to the immediate supply of planting material provided, in brief, for;

- (1) the rehabilitation or establishment and the maintenance of 150 acres of budwood nursery of which 75 acres would be located at the R.R.I. Experiment Station and the balance at Agricultural Stations;
- (2) the planting annually of $62\frac{1}{2}$ acres of clonal seedling nursery of which $37\frac{1}{2}$ acres would be located on the R.R.I. Experiment Station and the balance on Agricultural Stations. A total of 125 acres of nursery was considered necessary for this purpose;
- (3) the collection and utilization, in the nurseries provided for in 2 above, of 5,000,000 clonal seeds;
- (4) the training of young men from the kampongs in sound practical methods related to rubber growing and production.

BUDWOOD NURSERIES

Demands on the Rubber Research Institute for budwood for field budding on smallholdings have been small at 2,075 yards. Supplies of budwood from earlier established nursery areas on the Experiment

Station have however been extensively used for budding further areas in the multiplication nursery. Of the 67½ acres available for budwood multiplication 65.5 acres had been budded at the end of 1951 and the balance will be completed early in 1952. Plentiful supplies of budwood of Tj.1, P.B.86, R.R.I.501 and G.1 will therefore be available in 1952.

CLONAL SEED SUPPLIES AND CLONAL SEEDLING PRODUCTION

The acreages planted with clonal seeds at Sungei Buloh each year since 1948 as shown in the reports of the Manager of the R.R.I. Experiment Station are quoted below. It should be noted that collection of clonal seed and establishment of nurseries commenced in July 1948 one year before approval for the Colonial Development and Welfare Scheme.

1948	..	12	acres
1949	..	42½	"
1950	..	41½	"
1951	..	25	"

In August 1951 it was decided that no restriction should be observed in the quantity of clonal seeds collected. It was also considered desirable that Agricultural Officers should feel that no limitation of seed supplies should prevent them from cultivating and planting the maximum areas of clonal seedling nurseries in their districts. Priority in the supply of clonal seed was therefore given to Agricultural Station nurseries, and planting at the R.R.I. Experiment Station was done only when supplies were in excess of Agricultural Station requirements. Of the 25 acres at Sungei Buloh 17 acres were planted in October.

First attention to the planting of Agricultural Station nurseries is justified by the high cost of distributing clonal seedling stumps and the declining fertility of the nursery area at the R.R.I. Experiment Station which was revealed in the growth of second crops of clonal seedlings. It has been considered that future plans for the provision of clonal seedling stumps for smallholders should provide relatively large nurseries suitably located to minimise distribution costs and on soil which will stand continuous cropping with rubber seedlings. The latter requirement indicates well drained peat-clay soils likely to be found in coastal areas.

We are grateful to the managements of the relatively small number of estates which have collaborated with us to provide the seed supplies in 1951.

The first six months of the year produced a small steady supply of seed and the amount collected was limited by the relatively small planting requirements at that season of the year. Slightly more than three-quarters of a million seeds were obtained and the million mark might have been reached had demand been stronger.

The principal seeding season was approximately a month later than in 1950 as a result of the abnormally late wintering. The maximum possible amount of seed was collected and efforts were made to increase the number of sources of supply. There are however a number of qualifications in the requirements for any seed producing area to be secured for the C.D. & W. Scheme which restrict extension; the area of suitable budded rubber must be relatively large, the undergrowth should be sparse, and an estate is unlikely to accept the terms offered under the C.D. & W. Scheme if it is already undertaking commercial sales of clonal seed.

Table I on page 28 shows the differences in time of the main seasons of seed-fall in 1950 and 1951. The general pattern is however consistent in the two seasons and the table brings out clearly the high peak of supply, which occurs during about three weeks, which may yield approximately one half of the season's seed supply. This is a factor which must be given careful consideration in any plans for increasing the supply of seed to small-holders.

Seed in 1951 was generally of excellent quality and the unusual coincidence of the main seed-fall with good planting conditions has favoured nursery establishment. Good stumps available in 1952 should therefore form a higher percentage of the seed utilized than in any previous year. The considerable increase in supplies in the last two weeks of December was rather exceptional.

Table II shows the distribution of seed supplies to the different States and Settlements and the quantity used on the smallholders' nursery at the R.R.I. Experiment Station. The latter quantity includes 323,900 seed collected on the Experiment Station.

The seed supplies to States and Settlements have not all been used on Agricultural Station nurseries, and the idea first applied in the development at Kalumpang, referred to in the report for 1949, of smallholders being assisted to grow their own clonal seedling stumps has been continued in Kelantan and introduced in Pahang,

Trengganu, Johore, Perak and Kedah as supplies of seed have permitted.

TABLE I. *Record of Seed Collections July to December 1950 and 1951*

Period	1950	1951
18th—24th July	18,000	—
25th—31st	22,000	—
1st—6th August	79,200	—
7th—13th	40,280	10,500
14th—20th	147,240	27,800
21st—27th	96,425	58,400
28th—3rd September	595,105	47,100
4th—10th	1,121,700	57,800
11th—17th	219,800	86,200
18th—24th	241,500	229,000
25th—1st October	414,700	533,600
2nd—8th	189,500	649,670
9th—15th	47,000	1,439,290
16th—22nd	33,500	616,220
23rd—29th	25,000	163,170
30th—5th November	25,000	38,260
6th—12th	25,000	94,300
13th—19th	—	20,800
20th—26th	25,000	36,750
27th—3rd December	—	12,950
4th—10th	39,800	26,000
11th—17th	10,700	10,800
18th—24th	14,000	176,300
25th—31st	31,000	203,300
TOTAL	3,461,450	4,537,210

TABLE II. *Distribution of Clonal Seed Supplies and of Clonal Seedling Stumps available from the R.R.I. Experiment Station, Sungei Buloh*

State	Clonal Seed	Clonal Seedling Stumps from Sungei Buloh
Selangor	213,090	51,000
Negri Sembilan	140,910	51,200
Malacca	148,140	41,000
Perak	792,420	120,000
Johore	694,080	211,000
Pahang	913,530	182,600
Kedah/Perlis	646,000	92,000
Penang & P. Wellesley	61,400	60,000
Kelantan	597,860	—
Trengganu	261,940	54,000
Smallholders' Nursery R.R.I. Experiment Station	1,164,340	—
TOTAL	5,633,710	862,800

The writer had the opportunity to inspect a large number of the smallholders' nurseries in Kelantan in July. These had been established for periods of from three to nine months. Maintenance was variable and was poorest in the younger nurseries and a satisfactory out-put of clonal seedlings from these nurseries would be dependent on subsequent action by smallholders to bring the maintenance up to standard.

Distribution of clonal seedling stumps took place in two seasons extending from the middle of March to the end of April and from the middle of September to the end of the first week of December. During these two periods lorries of the Agricultural Department's Transport Pool made five trips a week from the R.R.I. Experiment Station carrying 10,000 stumps or more on each occasion. In this way clonal seedling stumps were supplied to every State and Settlement except Kelantan and these stumps were additional to the supplies available from Agricultural Stations in all areas. In allocating supplies from the Rubber Research Institute an attempt was made to supply an equitable proportion of each district's requirements and at the same time arrange the supply at reasonable planting seasons. On this account supplies during the March/April season, when planting conditions are less favourable went primarily to coastal areas while the inland areas most susceptible to drought received supplies only in the main planting season.

FUTURE SUPPLIES OF PLANTING MATERIAL

The Colonial Development and Welfare Scheme as originally conceived contained provision for a future independent source of clonal seed which can be relied upon to produce high-yielding rubber trees. This is to be developed from the nursery areas at the R.R.I. Experiment Station by the establishment of close-planted hedges at 60' intervals. The hedges have been budgrafted with a sequence of approved clones designed to give the maximum of cross pollination for seed production purposes consistent with the use of the hedge-planting system which is necessitated by the preliminary use of the land for nurseries. Each approved clone is budgrafted at not more than three consecutive points along a hedge. Clones used in two sections of the garden are noted below:

- Section 1. Tj.1, R.R.I.501, P.R.107, T.K.14 & B.R.2.
 „ 2. Tj.1, B.R.2, P.B.49, Avros 157 & R.R.I.509.

Seed production from this seed garden might be expected to commence about 1954 and the area should eventually provide over two million seed per annum.

The popularity of clonal seedlings as planting material amongst smallholders, the probable future increase in planting and the difficulty of securing adequate supplies from commercial sources, except at excessive prices, have suggested that further establishment of areas for clonal seed production should be undertaken in areas which can be controlled for the benefit of smallholders.

Areas where either new planting or replanting is being undertaken in large compact blocks in the region of 200 acres or more are suitable for development into seed gardens. Seed production will of course be subsidiary to the main function of rubber production for the owners of the individual holdings and the systematic mixing of clones, desirable for maximum seed production, will not be attempted while clones must be selected for yield and general characters as well as for good progeny. Clones Tj.1, R.R.I.501, and P.R.107 suggest themselves for these gardens and it will probably be satisfactory to limit to one the number of clones on any holding of 5 acres or less. A further advantage of the establishment of seed gardens on land occupied by smallholders may be expected from the availability of an economic source of labour in the smallholders' families for the collection of seed. The areas will also provide smallholders with experience in the maintenance and tapping of their own budgrafted trees.

The first area to be selected for the purpose has been an area of 177 acres at Kampong Romania in the district of Temerloh. The owners of the land have indicated their willingness to have budgrafted rubber trees of the selected clones and in return for the budgrafting of the area, which will be carried out with funds from the Colonial Development and Welfare Scheme, they have undertaken to make available to Government all future seed supplies from the area. The area has been planted with ordinary seedling stumps and a small budwood nursery has been established with budded stumps from the R.R.I. Experiment Station.

A further possible seed-producing area may be developed with the large rubber area of the land colonisation scheme at Sungei Durian in Perak.

PROVISION OF TECHNICAL ASSISTANCE

In 1950 accommodation had not yet been built at Sungei Buloh to allow for the implementation of the scheme for training young men from kampongs in the practical aspects of growing and producing rubber. A small start had however been made using the limited R.R.I. hostel accommodation and two courses each for a group of ten young men had been started in succession. The second of these terminated in February 1951 and altogether 17 persons had attended the two courses.

The special accommodation built with Colonial Development and Welfare Funds at Sungei Buloh became available later in the year and in the middle of April it was possible to provide for 25 trainees. Only 23 men attended at this time and these commenced training on April 16th. This course was interrupted by the fasting month when the trainees, of whom 22 were Malay, wished to return to their homes. On the resumption of the course accommodation was available for a further 17 trainees but only 14 were selected and sent to Sungei Buloh by the State and Settlement authorities.

The two groups of young men completed their training successively at the end of October and during December. All were subject to practical and oral tests and special attention was given to the important question of their skill in budgrafting. They received graded certificates according to their skill and knowledge and the numbers in each category are recorded below:

	Grade	Budgrafting	General
I.	Very Good ..	2	3
II.	Good ..	23	19
III.	Satisfactory ..	12	11
IV.	Below Standard..	—	4

Difficulties in the organisation of these courses arise from our inability to maintain unchanged supervision since Rubber Instructors cannot generally be spared from their stations for periods longer than one month. The seasonal nature of much of the work on which instruction has to be provided precludes adherence to a rigid programme. It has however been possible to provide a flexible training schedule in which proportional time is allocated to each subject. The difficulties of lack of continuity in supervision have been reduced by the provision of a series of printed lecture notes in romanised

Malay which with the past programme of work will keep successive Rubber Instructors informed of teaching requirements.

In future it has been decided that two courses each of $4\frac{1}{2}$ months duration shall be held during a twelve month period and these shall be arranged so that the month of Ramadhan is not included.

Record of Replanting by Smallholders since 1945

State/Settlement	1945/48	1949	1950	1951	Total
Selangor	1,571	449	525	402	2,947
Negri Sembilan	330	148	291	327	1,096
Malacca	515	169	336	663	1,683
Perak	621	632	923	888	3,064
Johore	2,040	349	513	578	3,480
Pahang	52	19	62	108	241
Kedah & Perlis	251	305	386	364	1,306
Penang & P. Wellesley	720	297	460	448	1,925
Kelantan	8	11	1	—	20
Trengganu	—	22	1	—	23
	6,108	2,401	3,498	3,778	15,785

Record of New Planting by Smallholders since 1945

State/Settlement	1945/48	1949	1950	1951	Total
Selangor	369	102	324	246	1,041
Negri Sembilan	462	150	363	892	1,867
Malacca	482	392	227	110	1,211
Perak	7	24	81	134	246
Johore	129	557	589	1,189	2,464
Pahang	392	229	1,434	1,370	3,425
Kedah & Perlis	35	52	272	1,190	1,549
Penang & P. Wellesley	26	45	—	—	71
Kelantan	77	396	148	220	841
Trengganu	57	2	143	237	439
	2,036	1,949	3,581	5,588	13,154

Replanting of Areas felled during the Japanese Occupation

State/Settlement	Area of Smallholding* rubber felled during the occupation	REPLANTED				Percentage of felled area replanted
		1945-48	1949	1950	1951	Total
Selangor	2,388	1,176	171	100	1	1,448
Negri Sembilan	1,327	85	24	40	75	224
Malacca	6,021	503	128	272	427	1,330
Perak	1,071	471	276	63	174	984
Johore	8,966	2,002	298	264	181	2,745
Pahang	218	13	—	—	2	15
Kedah & Perlis	2,179	153	188	189	179	709
Penang & P. Wellesley	3,095	666	275	460	439	1,840
Kelantan	3,066	8	6	1	—	15
Trengganu	7	—	—	—	—	—
	28,338	5,077	1,366	1,389	1,478	9,310
						32.9

* Figures taken from Rubber Statistics Handbook

Acreages Planted with Clonal Seedling and Budgrafted

State/Settlement	PLANTED WITH CLONAL SEEDLING					BUDGRAFTED				
	1949	1950	1951	Total		1948	1949	1950	1951	Total
Selangor	169	629	611	1,409		147	278	176	68	669
Negri Sembilan	191	305	682	1,178		65	73	200	185	523
Malacca	117	282	426	825		445	305	370	202	1,322
Perak	217	865	836	1,918		57	196	55	130	438
Johore	66	524	1,004	1,594		450	395	802	324	1,971
Pahang	170	1,315	1,279	2,764		7	10	15	12	44
Kedah & Perlis	86	461	686	1,233		33	42	101	894	1,070
Penang & P. Wellesley	52	288	180	520		158	88	237	49	532
Kelantan	—	20	188	208		2	76	340	298	716
Trengganu	22	137	237	396		—	17	18	6	41
	1,090	4,826	6,129	12,045		1,364	1,480	2,314	2,168	7,326

